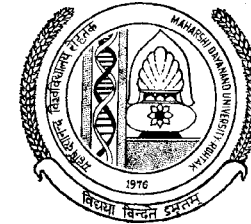


Maharshi Dayanand University Rohtak



Syllabus and Courses of Reading for B.E 7th & 8th Semester Mechanical Engg. Examination

Session 2010-2011

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M.D.University, ROHTAK
SCHEME OF STUDIES & EXAMINATION
B.E. 4th YEAR MECHANICAL ENGINEERING
SEMESTER VII

Modified 'E' Scheme effective from 2006-07

Course No.	Subject	Teaching Schedule				Marks of Class Work	Examination Theory	Practical	Total Marks	Duration of Exam (in hrs.)
		L	T	P	Total					
ME - 401 E	Auto-mobile Engg.	3	1	-	4	50	100	-	150	3
ME - 403 E	Ref. & Air-conditioning	3	1	-	4	50	100	-	150	3
ME - 405 E	Operations Research	3	1	-	4	50	100	-	150	3
ME - 407 E	Open Elective* Mechanical Vibration	3	1	-	4	50	100	-	150	3
ME-409-E	Auto-Mobile Lab.	-	-	2	2	25	-	25	50	3
ME-411-E	R.A.C Lab.	-	-	3	3	50	-	50	100	3
ME 413 E	Project	-	-	4	4	50	-	-	50	3
ME 415 E	Practical Training -II	-	-	2	2	-	-	-	-	-
Total		15	5	11	31	375	600	75	950	

List of Open Electives

1	HUM-451-E	Languages Skills for Engineers	8	CSE-451-E	Artificial Intelligence & Expert Systems
2	HUM-453-E	Human Resource Management	9	CSE-303-E	Computer Graphics
3	HUM-457-E	Business Communication	10	IC-455-E	Intelligent Instrumentation for Engineers
4	HUM-455-E	Entrepreneurship	11	IC-403-E	Embedded Systems Design
5	PHY-415-E	Nano Technology	12	CH-453-E	Pollution & Control
6	PHY-453-E	Laser Technology	13	IT-471-E	Management Information Systems
7	ME-451-E	Mechatronics Systems	14	IT-204-E	Multimedia Technologies

Note :

- Students will be permitted to opt. for any elective run by the other departments. However, the departments will offer only those electives for which they have expertise. The choice of the students for any elective shall not be a binding for the department to offer, if the department does not have expertise.
- Project load will be treated as 2 hrs. per week for Project coordinator and 1 hr. for each participating teacher. Project will committee in VIII semester where the students will identify the Project problem, complete the design/ procure the material/ start the fabrication/ complete the survey etc., depending upon the nature of the problem. Project will continue in VIII the semester.
- Assessment of Practical Training-II, carried out at the end of VI semester, will be based on seminar, viva-voce and project report of the student from the industry. According to performance, letter Grades A, B, C, F are to be awarded. A student who is awarded 'F' grade is required to repeat Practical Training.
- Students will be allowed to use the non-programmable scientific. However, sharing of calculator will not be permitted.

ME - 401 E AUTOMOBILE ENGINEERING

L	T	P	Sessional	: 50 Marks
3	3	1	Theory	: 100
Marks				
Total : 150				

Duration of Exam. : 3 hrs.

Unit I

Introduction to Automobiles : Classification, Components, requirements of Automobile Body; Vehicle Frame, Separate Body & Frame, Unitised Body, car Body Styles, Bus Body & Commercial Vehicle Body Types; Front Engine Rear Drive & Front Engine Front drive Vehicles, Four Wheel Drive Vehicles, Safety features of latest vehicle; Future trends in automobiles.

Unit II

Clutches : Requirement of Clutches - Principle of Friction Clutch - Wet Type & Dry Types; Cone Clutch, Single Plate Clutch, Diaphragm Spring Clutch, Multi plate Clutch. Centrifugal Clutches, Electromagnetic Clutch, Over Running Clutch; Clutch Linkages.

Unit III

Power Transmission ; Requirements of transmission system : General Arrangement of Power Transmission system; Object of the Gear Box; Different types of Gear Boxes; Sliding Mesh, Constant Mesh Synchro- mesh Gear Boxes; Epi-cyclic Gear Box, Freewheel Unit. Overdrive unit-Principle of Overdrive, Advantage of Overdrive, Transaxle, Transfer cases.

Unit IV

Drive Lines, Universal Joint, Differential and Drive Axles : Effect of driving thrust and torque reactions; Hotchkiss Drive, Torque Tube Drive and radius Rods; Propeller Shaft, Universal Joints,

Slip Joint; Constant Velocity Universal Joints; Front Wheel Drive; Principle, Function, Construction & Operation of Differential; Rear Axles, Types of load coming on Rear Axles, Full floating, Three quarter Floating and Semi Floating Rear Axles.

Unit V

Suspension Systems : Need of Suspension System, Types of Suspension; factors influencing ride comfort, Suspension Spring; Constructional details and characteristics of leaf springs.

Unit VI

Steering System : Front Wheel geometry & Wheel alignment viz. Caster, Camber, King pin Inclination, Toe-in/ Toe-out; Conditions for true rolling motions of Wheels during steering; Different types of Steering Gear Boxes; Steering linkages and layout' Power steering - Rack & Pinion Power Steering Gear, Electronics steering.

Unit VII

Automobile Brakes, Tyres & Wheels : Classification of Brakes; Principle and constructional details of Drum Brakes, Disc Brakes; Brake actuating systems, Mechanical, Hydraulic, Pneumatic Brakes; Factors affecting Brake performance, Power & Power Assisted Brakes; Tyres of Wheels; Types of Tyre & their constructional details Wheel Balancing, Tyre Rotation of Tyre of Tyre wear & their causes.

Unit VIII

Emission Control System & Automotive Electrical : Sources of Atmospheric Pollution from the automobile, Emission Control Systems - Construction and Operation of Positive Crank Case ventilation (PVC) Systems, Evaporative Emission Control. Heated Air Intake System, Exhaust Gas Recirculation (ECR)

Systems, Ait Injection System and Catalytic Converters; Purpose construction & operation of lead acid Battery, Capacity Rating & Maintenance of Batteries; Purpose and Operation of Charging Purpose and Operations of the Starting Systems; Vehicle Lighting System.

Text Books :-

1. Automobile Engineering by Anil Chhikara, satya Prakashan, New Delhi.
2. Automobile Engineering by Dr. Kirpal Singh, standard Publishers Distributors.

References Books :

1. Automotive Mechanics - Crouse / Anglin, TMH.
2. Automotive Technology - H.M. Sethi, TMH, New Delhi.
3. Automotive Mechanics - S.Srinivasan, TMH, New Delhi.
4. Automotive Mechanics - Joseph Heitner, EWP.
5. Motor Automotive Technology by Anthony E. Schwaller - Delmer Publishers, Inc.
6. The Motor Vehicle - Newton steeds Garrett, Butter Worths.

Note : In the semester examination the examiner will set eight questions in all, at least one question from each unit & students will be required to attempt only 5 questions.

ME - 403 E REFRIGERATION & AIR CONDITIONING

L	T	P	Sessional	: 50 Marks
3	1	-	Theory	: 100 Marks
			Total	: 150
			Duration of Exam.	: 3 hrs.

Unit I

Introduction : Definition of refrification & air conditioning : Necessity; Methods of refrigeration; Unit of refrigeration; Coefficient of performance (COP), Fundaments of air-conditioning, Comparative study, secndary refrigerants, Introduction to eco-friendly Refrigerants; Introduction to Cryogenics.

Unit II

Air Refrigeration System : Carnot refrigeration cycle. Temperature. Limitations; Brayton refrigeration or the Bell Coleman air refrigeration cycle; Necessity of cooling the aero plane; Air craft refrigeration systems, Simple cooling and Simple evaporative types, Boot strap and Boot starap evaporative types, Refrigerative type and Reduced Ambient type system, Comparison of different systems, problems.

Unit III

Vapour Compression(VC) Refrigeration Systems :

- (A) Simple Vapour Compression (VC) Refrigeration systems- Limitations of Reserved Carnot cycle with vapour as the refrigeration; Analysis of VC cycle considering degrees of sub cooling and superheating ; VC cycl on p-v,t-s and p-h diagrams; effects of operating conditions on COP; Comparison of VC cycle with Air Refrigeration cycle.
- (B) Multistage Ref. Systems - Necessity of compound compression, Compound VC cycle, Inter-cooling with liquid sub-cooling and / or water inter cooler; Multistage compression with flash inte-cooling and /or water inter-cooling; systems with individual or multiple expression values;

Individual compression system with individual or expansion values; Individual compression system with individual or multiple expansion valves but with and without intercoolers.

Unit IV

Other Refrigeration Systems :

- (A) Vapour Absorption Refrigeration systems- Basic Systems, Actual COP of the system, Performance, Relative merits and demerits; Properties of aqua ammonia; Electrolux Refrigeration; Problem.
- (B) Stream Jet Refrigerating System - Introduction, Analysis, Relative merits and demerits performance Applications, Problems.
- (C) Cascade Refrigerating Systems - Necessity Selection of Pairs of refrigerations for the system, Concept of cascade temperature, Analysis, Multistaging, Comparison with V.C. Systems, Application, Problems.

Unit V

Psychrometry of Air * Air Conditioning Processes : Properties of moist. Air-Gibbs Dalton law, Specific humidity, Dew point temperature, Degree of saturation, Relative Dalton law, Specific humidity, Dew point temperature, Degree of saturation, Relative humidity, Enthalpy, Humid specific heat, Wet bulb temp., Psychrometric chart; Psychrometry of air-conditioning processes. Mixing Process, Basic processes in conditioning of air; Psychrometric n air washer, Problems.

Unit VI

Air Conditioning Load Calculations : Outstanding and inside design conditions sources heating load ; Sources of cooling load; Heat transfer through structure, Solar radiation Electrical applications, Infiltration and ventilation Heat generation inside conditioner space; Apparatu selection; Comfort chart Problem.

Unit VII

Air Conditioning Systems with Controls & Accessories : Classifications, Layout of plants; Equipment selection; air distribution system; Duct systems Design; Filters; Refrigerant piping; Design of summer air-conditioning and Winter air conditioning system; Temperature sensors, Pressure sensors, Humidity sensors, Actuators Safety controls; Accessories; Problem.

Unit VIII

Refrigeration and Air Conditioning Equipments ; Type of compressors and their performance curves; Types of Condensers, Heat transfer in condensers; Types of expansion devices; types of evaporators, Colling and Dehumidifying coils, Problems.

Text Books :-

1. Refrigeration & Air conditioning -R.C. Jordan and G.B. Priester, Prentise Hall of India.
2. Refrigeration & Air conditioning -C. P. Arora, TMH, New Delhi.

References Books :

1. A course in Refrigeration & Air Conditioning - Arora & Domkundwar, Dhanpat Rai & Sons.
2. Refrigeration & air conditioning - W.F. Stocker and J.W. Jones, TMH, New Delhi.
3. Refrigeration & Air conditioning- Manohar Prasad Wiley Eastern Limited, New Delhi.

Note 1 In the semester examination the examiner will set eight questions in all, at least one question from each unit & students will be required to attempt only 5 questions.

2 Charts, tables, scientific calculator, data book and designed books as per requirement as per requirement of a per be allowed in the examination.

ME - 405 E OPERATIONS RESEARCH

L	T	P	Sessional	: 50 Marks
3	1	-	Theory	:100 Marks
			Total	: 150
			Duration of Exam.	: 3 hrs.

Unit I

Introduction : Definition, role of operations research in decision-making, applications in industry. Concept on O.R.model building - Types & methods.

Unit II

Linear Programming (LP) : Programing definition, formulation, solution - graphical simplex Gauss Jordan reduction process in simplex methods, BIG-M methods computational, problem.

Unit III

Deterministic Model : Transportation model-balanced & unbalanced; orth west rule, Vogel's Method, Least cost or matrix minimal, Stepperg stone method, MODI methods, degeneracy, assignment, travelling salesman, problem.

Unit IV

Advanced Topic of LP : Duality, PRIMAL-DUAL, reactions-its solution, shadow price, economic interpretation, dual simplex, post-optimality & sensitivity analysis, problems.

Unit V

Waiting Line Models : Introduction, queue parameters, M/M/1 queue, performance of queuing systems, applications in industries, problems.

Unit VI

Project Line Models : Network diagram, event activity, defects in network, PERT & CPM, float in network, variance and probability of completion time, project cost-direct, indirect, total optimal project cost by crashing of network, resources leveling in project problems.

Unit VII

Simulation : Introduction, design of simulation, models & experiments, models validation, process generation time mecahnism, Monte Carlo methods - its applications in industries problems.

Unit VIII

Decision Theory : Decision Theory : Decision process, SIMON model types of decision making environment- certainty, risk uncertainty, decision making with utilities problems.

Text Books :-

1. Operation Research - TAHA, PHI, New Delhi.
2. Principle of Operations Resaerch - Ackoff, Churchaman, arnoff, Oxford IBH,

References Books :

1. Operations Research - Gupta & Sharma, National Publishers, New Delhi.
2. Quantitative Techniques - Vohra, TMH, New Delhi.
3. Principles of operation Research (with Appliations to Managerial Decisions) by H.M. Wagher, Prentice Hall of India, New Delhi.
4. Operation Research - Sharma, Gupta, Wiley Eastern, New Delhi.
5. Operation Research - Philips, Revindran, Solgeberg, Wiley ISE.

Note : Paper setter will set eight questions, at least one from each unit Students are required to answer 5 questions.

ME - 407 E MECHANICAL VIBRATIONS

L T P	Sessional	: 50 Marks
3 1 -	Theory	:100 Marks
	Total	: 150
	Duration of Exam.	: 3 hrs.

Unit I

Fundamentals : Importance of Study of Vibrations, Classifications of Vibrations Free and Forced, Undamped and Damped, Linear and Non-linear, Deterministic and Random, Harmonic Motion, Vector and Complex Number Representations Definitions and Terminology, Periodic Functions, Harmonic Analysis, Fourier Series Expansion.

Unit II

Free and Damped Vibrations : Single Degree of Freedom system, D' Alemberts Principles, Energy Methods, Rayleighs Method, Application of these Methods, Damped Free Vibrations, Logarithmic Decrement Under Damping Critical and Over Damping, Coulomb Damping.

Unit III

Harmonically Excited Vibrations : Forced Damped Harmonic Vibration of single Degree of Freedom Systems, Rotating Unbalance, Critical Speeds and Whirling of Rotating Shafts, Support Motion Vibration Isolation. Energy Dissipated by Damping Equivalent, Viscous Damping. Structural Damping Sharpness of Resonance, Vibration Measuring Instruments.

Unit IV

Transient Vibrations : Impulse Excitation, Arbitrary Excitation, Response to step Excitations, Base Excitation Solution by Laplace Transforms Response Spectrum Runge-Kurta Method.

Unit V

Two Degrees of Freedom System - Introduction to MultiDegree of Freedom Systems Normal Mode Vibrations, Coordinate

Coupling Principal Coordinates, Free Vibrations in Terms of Initial Conditions, Forced Harmonic Vibrations, Vibrations Absorber, Centrifugal Vibration Absorber, Vibration Damper.

Unit VI

Multi degrees of Freedom systems and Numerical Methods Introduction Influence Coefficients, Stiffness Matrix, Flexibility Matrix, Natural frequencies and Normal Modes, Orthogonality of Normal Modes, Dunkerley's Equation, Method of Matrix Iteration, The Holzer Type Problem Geared and Branched Systems, Beams.

Unit V

Normal Mode Vibrations of Continuous System : Vibrating String, Longitudinal Vibrations of Rod, Torsional Vibrations of Rod, Lateral Vibrations of Beam.

Text Books :-

1. Theory of Vibration with Applications W.T. Thomson, Prentice Hall of India.
2. Mechanical Vibration : G.K. Grover and S.P. Nigam, Nem Chand and Sons.

References Books :

1. Theory and Practice of Mechanical Vibrations J.S. Rao and K. Gupta , Wiley Eastern Ltd.
2. Mechanical Vibrations S.S. Raop, Addison - Wesley Publishing Company.

Note : In the semester examination the examiner will set eight questions in all, at least one question from each unit & students will be required to attempt only 5 questions.

ME - 409 E AUTOMOBILE ENGINEERING LAB.

L T P	Sessional	: 25 Marks
- - 2	Practical	: 25 Marks
	Total	: 50
	Duration of Exam.	: 3 hrs.

List of Experiments :

- To Study and prepare report on the constructional details, working principles and operation of the following Automobile Engine Systems & Sub Systems.
 - Multi-cylinder : Diesel and Petrol Engines.
 - Engine cooling & lubricating Systems
 - Engine starting Systems.
 - Contact Point & Electronic Ignition Systems.
- To Study and prepare report on the constructional details, working principles and operation of the following Fuels supply Systems.
 - Carburators
 - Diesel Fuel Injection Systems
 - Gasoline Fuel Injection Systems.
- To Study and prepare report on the constructional details, working principles and operation of the following Automotive Clutches.
 - Coil-Spring Clutch
 - Diaphragm - Spring Clutch
 - Double Disk Clutch.
- To Study and prepare report on the constructional details, working principles and operation of the following Automomotive Transmission Systems.
 - Synchromesh - Four speed Range.
 - Transaxle with Dual Speed Range

- Four Wheel Drive and Transfer Case.
 - Steering column and Floor - Shift levers.
- To Study and prepare report on the constructional details, working principles and operation of the following Automomotive Drive Lines & Differentials.
 - Rear Wheel Drive Line.
 - Front Wheel Drive Line.
 - Differentials, Drive Axles and Four Wheel Drive Line.
 - To Study and prepare report on the constructional details, working principles and operation of the following Automomotive Suspension Systems.
 - Front Suspension System
 - Rear Suspension System
 - To Study and prepare report on the constructional details, working principles and operation of the following Automomotive Steering Systems.
 - Manual Steering Systems, e.g. Pitman - armsteering, Rack & Pinion steering.
 - Power steering systems, e.g. Rack and Pinion Power Steering System.
 - Steering Wheels and Columns e.g. Tilt & Telescope Wheels, Collapsible Steering Columns.
 - To Study and prepare report on the constructional details, working principles and operation of the following Automomotive Tyres & Wheels
 - Various Types on Bias Rsdial Tyres.
 - Various Tyres of Wheels.
 - To Study and prepare report on the constructional details, working principles and operation of the following Automomotive Brake Systems.

- (a) Hydraulic & Pneumatic Brake systems.
 - (b) Drum Brake System
 - (c) Disk Brake System
 - (d) Antilock Brake System
 - (e) Antilock Brake System
10. To Study and prepare report on the constructional details, working principles and operation of the following Automotome Emission/ Pollution control systems.
11. Modelling of any two automotive systems on 3D CAD using educational softwares (eg. 3D modelling package/ Pro Engineering/ I-Deas/ Solid edge etc.)
12. Crash worthiness of the designed frame using Hypermesh and L-S Dynasolver or other software.

Note : At least ten experiments are to be performed in the semester.

At least seven experiments should be performed from the above list. Remaining three experiments institute as per the scope of the syllabus.

ME - 413 E PROJECT

L T P	Sessional	:	100
Marks - -	6		
Practical: 100 Marks			
Total : 200			

Duration of Exam. : 3 hrs.

Project involving design/ fabrication/ testing computer simulation/ case studies etc. which is commenced in VIIth semester, will be completed in VIIIth Semester and will be evaluated through a panel of examiners consisting of HOD of the concerned department, project coordinator and one external examiner to be appointed by the University.

The student will be required to submit three copies of his/ her project report to the office of the concerned department for record (one copy each for the deptt. Office, participating teacher and college library).

Project coordinator will be assigned the project load of 2 hrs., per week while the participating teachers will be assigned 1hr. load for the same.

ME - 415 E PRACTICAL TRAINING - II

At the end of sixth semester each student would undergo six Practical Training in an Industry/ Professional/ Organization/ Research Laboratory with the prior approval of the Director-Principal of the concerned college and submit a written typed report along with a certificate from the organization. The report will be evaluated during VII Semester by a Board of Examiners to be appointed by the Director-Principal/principal of the concerned college who will award one of the following grades :

Excellent	:	A
Good	:	B
Satisfactory	:	C
Not satisfactory	:	F

A student who has been awarded 'F' grade will be required to repeat the practical training.

M.D.University, ROHTAK
SCHEME OF STUDIES & EXAMINATION
B.E. 4th YEAR MECHANICAL ENGINEERING
SEMESTER VIII

Modified 'E' Scheme effective from 2007-08

Course No.	Subject	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam (in hrs.)
		L	T	P	Total		Theory	Practical		
ME - 402 E	Computer Added Design	3	1	-	4	50	100	-	150	3
ME - 404 E	Power Plant Engg.	3	1	-	4	50	100	-	150	3
ME -	Deptt. Elective-I	4	-	-	4	50	100	-	150	3
ME -	Deptt. Elective-II	4	-	-	4	50	100	-	150	3
ME- 406-E	CAD Lab.	-	-	3	3	50	-	50	100	3
ME- 408-E	Independent Study Seminar	-	-	4	4	50	-	-	50	3
ME 413 E	Project	-	-	8	8	50	-	100	150	3
GEME 402 E	General Fitness for the Professional*	-	-	-	-	50	-	100	150	3
Total		14	2	15	31	400	400	250	1050	

Deptt. Electives - I

1. ME-432 E Optimization for Engineering Systems
2. ME-434 E Computer Aided Vehicle Design
3. ME-436 E Mechatronics
4. ME-438 E Flexible Manufacturing Systems

Deptt. Electives - II

1. ME-442E Robotics Engineering
2. ME-444E Ergonomics and Work Place Design
3. ME-446 E Modern Manufacturing Processes
4. ME-448 E Emerging Automotive Technologies

Note :

- 1 Project load will be treated as 2 hrs. per week for Project co-ordinator and 1 hr. for each participating teacher. Project will committee in VIII semester where the students will identify the Project problem, complete the design/ procure the material/ start the fabrication/ complete the survey etc., depending upon the nature of the problem. Project will continue in VIII the semester.
2. For the subject ME-408 E, a student will select a topic from engineering or Mech. Engg. and study it thoroughly and independently. later he will give a seminar talk on the topic.
3. The Evaluation of the student for his/ her Genral Fitness for the Profession shall be carried out by a team consisting of Principal/ Director, HOD of concerned department and external examiner, appointed by University.
4. Students will be allowed to use the non-programmable scientific. However, sharing of calculator will not be permitted.
5. * The subject GFME-420-E (General Proficiency) code has been changed to GFME- 402-E and will be effective from 2006-07.

ME - 402 E COMPUTER AIDED DESIGN

L T P
3 1 -

Sessional : 50 Marks
Theory : 100 Marks
Total : 150
Duration of Exam. : 3 hrs.

Unit I

Introduction : Introduction to CAD/CAM, Historical developments, Industrial look at CAD/CAM, Introduction to CIM ; Basics of geometric and solid modeling, explicit, implicit, intrinsic and parametric equations, coordinate systems.

Unit II

Transformations : Introduction, transformtaion of points and line, 2-D rotation, reflection, scaling and combined transformation, homogeneous coordinates, 3-D scaling, shearing, rotation, reflection and translation, combined transformations, orthographic and perspective projections, reconstruction of 3-D objects.

Unit III

Curves : Algebraic and geometric forms, tangents and normal, blending functions reparametrization, straight lines, conlcs, cubic splines, Bezier curves and B-spline curves.

Unit IV

Surfaces : Algebraic and geometric forms, tangents and normal, blending functions, reparametrization, sixteen point form, four curve form, plane surface, ruled surface, surface of revolution, tabulated cylinder, bi-cubic surfae, bezier surface, B-spline surface.

Unit V

Solids : Solid models and representation scheme, boundary representation, constructive solid geometry, sweep representation, cell decomposition, spatial occupancy enumeration.

Unit VI

Finite Element Modelling : Types of FE analysis ; Degree of freedom; Influence coefficient; Element and stiffness equations; Application of FE analysis to 1-D thermal problem; Assembly procedure; General structure of a FE analysis procedure.

Text Books :-

1. CAD/ CAM by Groover and Zimmer, Prantice Hall.
2. CAD/ CAM Theory and Practice by Zeid, MGrav Hill.
3. Mathematical Elements for computer Graphics by David F. Rogers and J. Alan Adams, Published by Mc Graw Hill, New York.

References Books :

1. CAD/ CAM (Principles, Practice & Manufacturing Management) by Chirs Mc Mohan & Jimmie Browne, Published by Addison- Wesley.

Note : In the semester examination the examiner will set eight questions in all, at least one question from each unit & students will be required to attempt only 5 questions.

ME - 404 E POWER PLANT ENGINEERING

L T P
3 1 -

Sessional : 50 Marks
Theory : 100 Marks
Total : 150
Duration of Exam. : 3 hrs.

Unit I

Introduction : Energy resources and their availability, types of power plants, selection of the plants, review of basic thermodynamic cycles used in power plants.

Unit II

Hydro Electric Power Plants : Rainfall and run-off measurements and plotting of various curves for estimating stream flow and size of reservoir, power plants design, construction and operation of different components of hydro-electric power plants, site selection, comparison with other types of power plants.

Unit III

Steam Power Plants : Flow sheet and working of modern-thermal power plants, super critical pressure steam stations, site selection, coal storage, preparation, coal handling systems, feeding and burning of pulverized fuel, ash handling systems, dust collection-mechanical dust collector and electrostatic precipitator.

Unit IV

Combined Cycles : Constant pressure gas turbine power plants, Arrangements of combined plants (steam & gas turbine power plants), re-powering systems with gas production from coal, using PFBC systems, with organic fluids, parameters affecting thermodynamic efficiency of combined cycles, Problems.

Unit V

Nuclear Power Plants : Principles of nuclear energy, basic nuclear reactions, nuclear reactors- PWR, BWR, CANDU, Sodium graphite, fast breeder, homogeneous; gas cooled. Advantages and limitations, nuclear power station, waste disposal.

Unit VI

Power Plant Economics : load curve, different terms and definitions, cost of electrical energy, tariffs methods of electrical energy, performance & operating characteristics of power plants - incremental rate theory, input-output curves, efficiency, heat rate, economic load sharing, Problems.

Unit VII

Non-Conventional Power Generation : Solar radiation estimation, solar energy collectors, low, medium & high temperature power plants, OTEC, wind power plants, tidal power plants, geothermal power plants.

Unit VIII

Direct Energy Conversion Systems : Fuel cell, MHD power generation-principle, open & closed cycles systems, thermoelectric power generation, thermionic power generation.

Text Books :-

1. Power station Engineering and Economy by Berhardt G.A skrotzki and William A. Vopat - Tata Mc Graw Hill Publishing Company Ltd., New Delhi.
2. Power Plants Engineering : P.K. Nag Tata Mc Graw Hill Second Edition 2001.

References Books :

1. Power Plant Engg. : M.M. EL- Wakil Mc Graw Hill second Edition 2001.

Note : In the semester examination the examiner will set eight questions in all, at least one question from each unit & students will be required to attempt only 5 questions.

ME - 406 E COMPUTER AIDED DESIGN LAB.

L	T	P	Sessional	: 25 Marks
-	-	2	Theory	: 25 Marks
			Total	: 50
			Duration of Exam.	: 3 hrs.

The students will be required to carry out the following exercises using software packages (e.g. 3D modelling package / Pro Engineer/ I-Deas/ Solid Edge etc.)

1. Implement simple programmes for the graphics representation of
 - a. Transformation and projections.
 - b. Conic Sections, cubic splines, and B-splines.
 - c. Surfaces - Bilinear, Bicubic surface patch and Bezler surface.
2. CAD Modelling Assignments
 - a. Construction of simple machine parts and components.
 - b. Modelling of machine components.

ME - 408 E INDEPENDENT STUDY SEMINAR

L T P	Sessional	: 50 Marks
- - 4	Total	: 50

The students will select a topic in emerging areas of Mech. Engg, and study independently. He will give a seminar talk on the before the committee constituted by the head of the dept. The committee should comprise of at least three faculty members from Thermal, Production & Design specializations.

ME - 413 E PROJECT

L T P	Sessional	: 100 Marks
- - 6	Practical	: 100 Marks
	Total	: 200

Marks

Duration of Exam. : 3 Hrs.

Project involving design/ fabrication/ testing computer simulation/ case studies etc. which is commenced in VIIth Semester and will be evaluated through a panel of examiner consisting of HOD of the concerned department, project coordinator and one external examiner to be appointed by the University.

The student will be required to submit three copies of his/ her project report to the office of the concerned department for record (one copy each for the deptt. Office, participating teacher and college library).

Project coordinator will be assigned the project load of 2 hrs. per week while the participating teachers will be assigned 1 hr. load for the same.

GFME - 402 E GENERAL FITNESS FOR THE PROFESSION

L	T	P	Class Work	: 50 Marks
-	-	-	Practical	: 100 Marks
			Total Marks	: 150

At the end of each year students will be evaluated on the basis of their performance in various fields. The evaluation will be made by the panel of experts/ examiners/ teachers to be appointed by the Principal/ Director of the College. A specimen perform indicating the weight age to each component/ activity is given below :-

Name : _____ College Roll No. _____

Univ. Roll No. _____

Branch _____ Year of Admission _____

I. Academic Performance (15 Marks) :

(a) Performance in University Examination :-

Sem.	Result	% age of Marks obtained	Number of Attempt in which the Sem. exam. has been cleared.
I			
II			
III			
IV			
V			
VI			
VII			

II. Extra Curricular Activities (10 Marks) :

Item	Level of Participation	Remarks (Position Obtained)
Indoor Games	_____	_____
(Specify the Games)	_____	_____
	_____	_____

Outdoor Games	_____
(Specify the Games)	_____
Essay Competition	_____
Scientific Technical Exhibitions	_____
Debate	_____

Drama	_____

Dance	_____

Music	_____

Fine Arts	_____

Painting	_____

Hobby Club	_____

N.S.S.	_____

Hostel Management _____

Activities _____

Any other _____

activity (Please _____

Specify _____

III. Educational tours/ visits/ Membership of Professional Societies (5 Marks)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

IV. Contribution in NSS Social Welfare Floor Relief/ draught relief/ Adult Literacy mission/ Literacy Mission/ Blood Donation/ Any other Social Service (5 Marks)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

V. Briefly evaluate your academic & other performance & achievements in the Institution (5 Marks)

VI. Performance in Viva voce before the committee (10 Marks)

*Marks obtained 1.()+II()+III()+IV()+V()+VI() =

** Total Marks :

Member	Member	Member	Member	Member	Member
--------	--------	--------	--------	--------	--------

**ME - 432 E OPTIMIZATION METHODS FOR
ENGINEERING SYSTEMS**

L	T	P	Sessional	: 50 Marks
3	1	-	Theory	: 100
Marks				
Total : 150				

Duration of Exam. : 3 hrs.

Unit I

Introduction : Engineering Applications; Statement of the Optimal Problem : Classification; Optimization Techniques.

Unit II

Classical Methods : Single Variable Optimization; Multivariable Optimization without any Constraints with Equality and Inequality Constraints.

Unit III

One Dimensional Minimization Methods : Uni-model Function ; Estimation Methods - Dichotomous Search, Fibonacci and Golden Section Methods; Interpolation Methods - Quadratic and Cubic Interpolation Methods.

Unit IV

Unconstrained Minimization Methods : Univariate, Conjugate Directions, gradient and Variable Metric Methods.

Unit V

Constrained Minimization Methods : Characteristics of a constrained problem; Direct Methods of feasible directions; Indirect Methods of interior and exterior penalty functions.

Unit VI

Geometric Programming : Formulation and Solutions of Unconstrained and Constrained geometric programming problems.

Unit VII

Dynamic Programming : Concept of Sub-optimization and the principle of optimality; Calculus, Tabular and Computational Methods in Dynamic programming : An Introduction to Continuous Dynamic Programming.

Unit VIII

Integer Programming : Gomory's Cutting Plane Method for Integer Linear Programming; Formulation & Solution of Integer Polynomial and non-linear problems.

Text Books :-

1. Optimization (Theory & Applications) -S.S. Rao, Wiley Eastern Ltd. New Delhi.
2. Optimization Concepts and Application in Engineering - Ashok D. Belegundu and Tirupathi R Chandrupatla - Pearson Education.

References Books :

1. Optimization : Theory and practice, C.S.G. Beveridge and R.S. Schechter, MGH, New York.

Note : In the semester examination the examiner will set eight questions in all, at least one question from each unit & students will be required to attempt only 5 questions.

ME - 434 E COMPUTER AIDED VEHICLE DESIGN

L T P	Sessional	: 50 Marks
3 1 -	Theory	: 100
Marks		
Total: 150		

Duration of Exam. : 3 hrs.

Unit I

Vehicle Frame and Suspension : Study of Loads- Moments and Stress on Frame Members. Computer Aided Design of Frame for Passenger and Commercial Vehicles. Computer Aided Design of Leaf Springs - Coil Springs and Torsion Bar Springs.

Unit II

Front Axle and Steering Systems : Analysis of Loads Moments and Stresses at different sections of front axle. Determination of Bearing Loads at Kingpin Bearings. Wheel Spindle Bearings. Choice of Bearings. Determination of Optimum Dimension and Proportions for Steering Linkage ensuring minimum error in Steering.

Unit III

Drive Line and Rear Axle : Computer Aided Design of Propeller Shaft. Design of Final Drive Gearing. Design details of Full-floating., Semi-floating and Three Quarter Floating, Rear Axle Shafts and Rear Axle Housings.

Unit IV

Clutch : Torque capacity Aided Design of Three Speed and Four Speed Gear Boxes.

Note :

Use of Software Packages for Analysis and Design of Mechanical Systems may be used for Design problem.

Text Books :-

1. Dean Avern, Automobile Chassis Design, Illiffe Books.
2. Heldt, P.M., Automotive Chassis, Chilton Co., New York.

References Books :

1. Steeds. W., Mechanics of Road Vehicles, Illiff Books Ltd. London.
2. Giles, J.G. Styering, Suspension and Tyres, Illiff Books Ltd. London.
3. Newton, Steeds & Garret, Motor Vehicle, Illiff Books Ltd. London.
4. Heldt, P.M. Torque Converter, Chilton Book Co., New York.

Note : In the semester examination the examiner will set eight questions in all, taking two questions each from Units I, II, III & one question each from Units IV & V. The students will be required to attempt 3 questions from PART-A & two questions compulsory from Part-B.

ME - 436 E MECHATRONICS

L	T	P	Sessional	: 50 Marks
3	1	-	Theory	: 100 Marks
			Total	: 150
			Duration of Exam.	: 3 hrs.

Unit I

Introduction and Basics : What is Mechatronics ?; A Measurement System with its constituent elements; Open and Closed Loop Systems; Sequential Controllers; Micro-processor Based Controllers; The Mechatronic Approach.

Unit II

Hardware of Measurement Systems ; A review of Displacement, Position Velocity, Motion, Force, Fluid Pressure, Liquid Flow, Liquid Level, Temperature, Light Sensors / alongwith Performance Terminology; Selection of Sensors; Input Data by Switches; Signal Conditioning; Brief Review of Operational Amplifier; Protection; Filtering; Wheat Stone Bridge; Digital Signals; Multiplexers; Data Acquisition; Digital Signal Processing; Pulse Modulation; Data Presentation Systems - Displays; Data Presentation Elements; Magnetic Recording; Data Acquisition System; Testing & Calibration; Problems.

Unit III

Pneumatic, Hydraulic, Mechanical and electrical Actuation Systems : Pneumatic and Hydraulic Systems; Directional Control Valves; Valve Symbols; Pressure Control Valves; Cylinder Sequencing; Process Control Valves; Rotary Actuators; Mechanical Aspect of Motor Selection; Electrical Systems; Mechanical & Solid State Switches; Solenoids; D.C. & A.C. Motors; Stepper Motors; Problems.

Unit IV

Systems Modelling and Performance : Engg. Systems; Rotational - Translational System; Electro-mechanical Systems;

Hydraulic - Mechanical System; A Review of modelling of First and Second Order Systems and Performance Measures; Transfer Functions for first order System, Second Order System, systems in series & Systems with Feedback Loops; Frequency Response of First Order and Second Order Systems; Bode Plots; Performance Specifications; Stability; Problems.

Unit V

Closed Loop Controllers : Continuous and Discrete processes - Lag, Steady State Error; Control Modes; Two - step Mode; Proportional Mode - Electronic Proportional Controllers; Derivative Control - proportional plus Derivative Control; Integral Control - Proportional plus Integral Control; PID Controller - Operational Amplifier PID Circuits; Digital Controllers - Implementing Control Modes; Control System Performance; Controller Tuning - Process Reaction Method & Ultimate Cycle Method; velocity Control; Adaptive Control; Problems.

Unit VI

Digital Logic and Programmable Logic Controllers : A Review of Number Systems & logic Gates; Boolean Algebra; Karnaugh Maps; Sequential Logic; Basic Structure of Programmable Logic Controllers; Input/ Output Processing; Programming; Timers, Internal Relays and Counters; Master & Jump Controls; Data Handling; Analogue Input/ Output; Selection of a PLC; Problems.

Unit VII

Microprocessors and Input/ Output Systems : Control; Microcomputer Structure; Micro - controllers; Applications; Programming Languages; Instruction Sets; Assembly Language Programs; Subroutines; Why C Language ? A review of Program Structure, Branches, Loops, Arrays, Pointer; Examples of Programs; Interfacing; Input/ Output; Interface Requirements; Peripheral Interface Adaptors; Serial Communication Interface; Examples of Interfacing; Problems.

Unit VIII

Design and Mechatronics : Design Process; Traditional and Mechantronics Design; Possible Mechatronics design solutions for Timed Switch, Wind Screen Wiper Motion, Bath Room Scale, A Pick & Place Robot, Automatic Camera, engine Management System & Bar Code Recorder.

Text Books :-

1. Mechantronics by W. Bolton, Published by Addition Wesley.
2. Mechantronics System Design - Devdas Shetty and Richard A. Kolx Brooks/ Cole 1997.

References Books :

1. Introduction to Mechantronics and Measuring System : david G. Alciation and Michael B. Hist and Tata McGraw Hill.
2. Mechantronics - Sensing to Implementation - C.R. Venkataraman, Sapna.

Note : In the semester examination the examiner will set eight questions in all, at least one question from each unit & students will be required to attempt only 5 questions.

ME - 438 E FLEXIBLE MANUFACTURING SYSTEM

L	T	P	Sessional	: 50 Marks
3	1	-	Theory	:100 Marks
			Total	: 150
			Duration of Exam.	: 3 hrs.

Unit I

Automation : Types of automation, reasons for automating, automating strategies, Detroit-type automation : Automated flow lines, methods of work part transport, Transfer mechanisms, buffer storage, automation for machining operations.

Unit II

Automated assmebly systems : Design for automated assembly, types of automated assembly systems, part feeding devices, quantitative analysis of the delivery system operation, analysis of a single- station assembly machine, numericals.

Unit III

Group Technology : Part families, parts classification and coding, types of classification and coding systems, Machine cell design : The composite part concept, types of cell designs, determining the best machine arrangement, benefits of group technology.

Unit IV

Flexible Manufacturing Systems : Components of an FMS, types of systems, where to apply FMS technology, FMS work stations. Material handling and storage system : Functions of the handling system, FMS layout configurations. Material handling equipments. Computer control system : Computer fuction, FMS applications and benefits.

Unit V

Robotic technology : Joints and links, common robot configurations, work volume, types of robot control, accuracy and repeatability, other specifications, end effectors, sensors in robotics.

Unit VI

Robot programming : Types of programming, lead through programming, motion Programming, interlocks, advantages and disadvantages. Robot languages : Motion programming, simulation and off-line programming, work cell control.

Unit VII

Robot applications : Characteristics of robot applications, robot cell design, types of robot applications : Material handling, procesing operations, assembly and inspection.

Text Books :-

1. Automation, Production Systems and Computer Integrated Manufacturing.
2. Groover M.P., Prentice Hall of India.

References Books :

1. Approach to Computer Integrated Design and Manufacturing Nava Singh, John Wiley and Sons, 1998.
2. Production Mangement Systems : A CIM Perspective Browne J, Harhen J, Shivnan J, Addison Wesley, 2nd Ed. 1996.

Note : In the semester examination the examiner will set eight questions in all, at least one question from each unit & students will be required to attempt only 5 questions.

ME - 442 E ROBOTICS ENGINEERING

L T P
3 1 -

Sessional : 50 Marks
Theory : 100 Marks
Total : 150
Duration of Exam. : 3 hrs.

Unit I

Robotic Manipulation : Automation and Robots; Robot Classification - Drive Technologies, Work- Envelope Geometrics, Motion Control Method, applications; Robot Specifications- No of Axes, Capacity and Speed, Reach and Stroke, Tool Orientation, Repeatability, Precision, Acuracy, Operating Environment, An Example; Rhino X-3

Unit II

Direct Kinematics : The Arm Equation Homogenous Co-ordinates - Frames, Translations and Rotations, Composite Homogenous Transformations; Screw Transformations; Link o-ordinates; The Arm Equation; A Five- Axis Articulated Robot; A Fou-Axis Scara Robot; A Six- Axis Articulated Robot; Problems.

Unit III

Inverse Kinematics : Solving the Arm Eqauion : The Inverse Kinematics Problem; General Properties of Solutions; Tool Configuration; Inverse Kinematics of a Five-Axis Articulated Robot, Four- Axis Scara Robot, Six- Axis Articulated Robot and three - Axis Planer Articulated Robot; A Robotic Work Cell; Problems.

Unit IV

Work Space Analysis and Trajectory Planning : Work Space Analysis; Work Envelope of a Five-Axis rticulated Robot; Work Envelope of a Four Axis Scara Robot; Work Space Fixtures; The Pick and Place Operation; Continuous Path Motion; Intepolated Motion; Straight Line Motion; Problems.

Unit V

Differential Motion and Statics : The Tool Configuration Jacobian Matrix; Joint - Space Singularities; Generalised Inverse; resolved -Motion Rate Control; $n > 6$; Rate Control of Redundant Robots : $n = 6$; Rate Control using (1- Inverse; The Manipulator Jacobian; Induced Joint Torques and Forces; Problems.

Unit VI

Manipulator Dynamics : Lagrange's Equation; Kinetic & Potential Energy Generalised Force; Lagrange - Euler Dynamic Model; Dynamic Models of a Two Axis Planar articulated Robot and A Three- axis SCARA Robot; Direct & Inverse Dynamics; Recursive Newton - Euler Formulation; Dynamic Model of a One Axis Robot; Problems.

Unit VII

Robot Control : The Control Problems; State Equations; Constant Solutions; Linear Feedback Systems; Single- axis PID Control; PID-Gravity Control; computed - Torque Control; Variable- structure Control; Impedance Control; Problem.

Text Books :-

1. Fundamental of Robotics (Analysis & Control) by Robert J. Shilling, Published by PHI, Pvt. Ltd. New Delhi.
2. Introduction to Robotics (Mechanics & control) by John J. Craig, Published by Addison Wesley (Intl. Student Edition).

References Books :

1. Analysis Robotics & Mechatronics by Wolfram Stadler, Published by Mc- Graw Hill, Inc. New Delhi.
2. Industrial Robotics - Technology, Programming & Applications by Mikell P. Grover, Weiss, Nagel and Ordef, Published by Mc Graw Hill International Edition.
3. A Robot Engg. Text Book - Mohsen Shahinpoor, Harper & Low, Publishing New York.

4. Robotic Engineering - An Integrated Approach : Richard D. LKlafter, Thomas A. Chmielewski and Michael Negin PHI 1989.
5. Foundations of Robotics Analysis and Control - Tsuneo Yashikawa MIT Press 1990, Indian Reprint 1998.
6. Robots and Control - R.K. Mittal and I.J. Nagrath - Tata Mc Graw Hill 2003.

Note : In the semester examination the examiner will set eight questions in all, at least one question from each unit & students will be required to attempt only 5 questions.

ME - 444 E ERGONOMICS AND WORK PLACE DESIGN

L T P	Sessional	: 50 Marks
3 1 -	Theory	:100 Marks
	Total	: 150
	Duration of Exam.	: 3 hrs.

Unit I

Basic Principles of Ergonomics, Anthropometry, Posture and Health; Anthropometry Practical; Displays, controls and HMI; Tools and Equipment Design; Workplace Design and Assessment; Task Analysis; Questionnaire and Interview Design; Product Design and Evaluation; Designing for manufacture and maintenance; Health and Safety Legislation and Ergonomics.

Unit II

Application of Ergonomics Principles, Cognitive Ergonomics, Human Information Processing; Memory; Reading; Perception; Navigation; Problem Solving; Decision Making, Human computer Interaction, Input/ Output technology, Usability; Evaluation; Health problems.

Unit III

Future Systems, Job Design, Scientific Management, Enrichment, Enlargement, Rotation, cells Shift work, Management Style and Job design Change Management. New Technology, Unemployment, Deskilling, Introduction new technology Questionnaire design and assessment. task analysis techniques. Measurement of human error & risk. Use of simulation and prototypes. Product Evaluation Experimental Design.

Unit IV

Case Studies ; A Set of case studies will be used to demonstrate how ergonomics has lead to changes in work activity, safety and product design. Case studies will include advanced computer applications, workspace assessment and re-design, accident

analysis and industrial inspection, and in manufacturing. Students will be required to apply the principles to a real life ergonomic design as applied to a product, service or computer application.

Text Books :-

1. Work design ; Industrial Ergonomics - Knorz, Stephan A., Johnso, Steven, Hlcomb Hathaway, Scottsdale, AZ.
2. Human Factors in engineering and design - Sanders, M.S. & Mc Cormick, E.J., 6 ed., Mc Graw Hill New York.

References Books :

1. Ergonomics : Man in his working environment - Murrell, K. F. H. Champan & Hall, London.
2. Man- Machine Engineering - Chapanis A : Wordsworth Publishing Co.
3. The Practice and Management of Industrial Ergonomics - Alexander, D.C. Prentice Hall, Englewood Cliffs, NJ.
4. Textbook of work Physiology - Astrand, P.O. & Rhodahl, K. - Mc Graw Hill, New York.
5. Human Factors in Lighting - Boyce, P.R. Ma Millan, New York
6. The Ergonomics of Worksaces and Machines : A design manual - Clark, T.S. & Corlett, E.N. Taylor & Francis, London.
7. Ergonomics atwork, Osborne D Wiley, London.
8. Bodyspace - Anthropometry, Ergonomics and Design.- Pheasant, S. Taylor & Francis.

Note : In the semester examination the examiner will set eight questions in all, at least one question from each unit & students will be required to attempt only 5 questions.

ME - 446E MODERN MANUFACTURING PROCESSES

L T P	Sessional	: 50 Marks
3 1 -	Theory	:100 Marks
	Total	: 150
	Duration of Exam.	: 3 hrs.

Unit I

Mechanical Processes : Ultrasonic Machining - Elements of process, cutting tool system design, effect of parameters, economic considerations, applications, limitations of the process, advantages and disadvantages. Abrasive Jet Machining - Jet cutting equipments, process details, advantages and applications.

Unit II

Electrochemical and Chemical Metal Removal Processes ; Electrochemical Machining - Elements of ECM process, tool work gap, chemistry of the process, metal removal rate, accuracy, surface finish and other work material characteristics economics, advantages, applications, limitations. Electrochemical Grinding - Material removal, surface finish, accuracy, advantages, applications.

Unit III

Thermal Metal Removal Process : Electric Discharge Machining (EDM) or Spark erosion machining processes, mechanism of metal removal, spark erosion generators, electrode feed control, dielectric fluids, flushing, electrodes for spark erosion, selection of electrode material, tool electrode design, surface finish, machining accuracy, machine tool selection applications Wire cut EDM. Laser beam machining (LBM) - Apparatus, material removal, cutting speed and accuracy of cut, metallurgical effects, advantages and limitations.

Unit IV

Plasma Arc Machining (PAM : Plasma non thermal generation of plasma, mechanism of metal removal, PAM parameters, equipments for D.C. plasma torch unit, safety precautions, economics, other applications of plasma jets. Electron Beam Machining (EBM) - Generation and control of electron beam, theory of electron beam machining, process capacities and limitations.

Text Books :-

1. Modern Machining Processes - P.C. Pandey, H.S. Shan, Tata McGraw Hill.
2. Machining Science - Ghosh and Malik, Affiliated East - West Press.

References Books :

1. Non Traditional Manufacturing Processes - Benedict G.F. Marcel Dekker
2. Advanced Methods of Machining - Mc Geough J.A. Chapman and Hall.

Note : In the semester examination the examiner will set eight questions in all, at least one question from each unit & students will be required to attempt only 5 questions.

ME - 448E EMERGING AUTOMOTIVE TECHNOLOGIES

L T P	Sessional	: 50 Marks
3 1 -	Theory	:100 Marks
	Total	: 150
	Duration of Exam.	: 3 hrs.

Unit I

The Future of the Automotive Industry : Challenges and Concepts for the 21st century . Crucial issues facing the industry and approaches to meet these challenges.

Unit II

Fuel cell Technology for Vehicle : What is fuel cell, Type of fuel cell Advantages of fuel cell. Current state of the technology. Potential and challenges Advantages and disadvantages of hydrogen fuel.

Unit III

Latest Engine Technology Features : Advantages in diesel engine technology. Direct fuel injection Gasoline engine Diesel particulate emission control. Throttling by wire. Variable Valve Timing, Method used to effect variable Valve Timing. Electromagnetic Valves, Camless engine actuation.

Unit IV

42 Volt System : Need benefits, potentials and challenges. Technology Implications for the Automotive Industry. technological evolution that will occur as a result of the adoption of 42 cvolt systems.

Unit V

Electrical and Hybrid Vehicles : Types of hybrid system, Objectives and Advantages of hybrid systems. Current status, Future developments and Prospects of Hybrid Vehicles.

Unit IV

Integrated Starter Alternator : starts stop operation, Power Assist, Regenerative Braking. Advanced lead acid batteries, Alkaline batteries, Lithium batteries. Development of new energy storage systems, Deep discharge and rapid charging ultra capacitors.

Unit III

X-By Wire Technology : What is X-By Wire , Advantage over hydraulic systems. Use of Automotive micro controllers Types of sensors. Use of actuators in an automobile environment.

Unit IV

Vehicles System : Constantly Variable Transmission, Benefits, Brake by wire, Advantages over power Braking System. Electrical assist steering by wire, Advantages of Steering by wire. Semi-active suspension system. Advantages of fully active suspension system.

Text & Reference Books :-

1. Advanced Vehicle Technologies by Heisler - SAE International Publication.
2. Electric and Hybrid Electric vehicle by Ronald K. Jugen.- SAE International Publication
3. Electric Braking, Traction and Stability control - SAE Hardbound papers.
4. Electric steering and suspension systems- SAE Hardbound papers.
5. 42 Volt system by Daniel J. Holt - SAE International Publication.
6. Diesel Particulate Emission by J.H. Johnson - SAE Hardbound papers.
7. Fuel Cell Technologies for Vehicles by Richard Stobart - SAE Hardbound Papers.

Note : In the semester examination the examiner will set eight questions in all, at least one question from each unit & students will be required to attempt only 5 questions.

ELECTIVE PAPERS FOR BE 7th & 8th SEMESTER**HUM-451-E LANGUAGE SKILLS FOR ENGINEERS**

L T P
4 - -

Class Work : 50 Marks

Exam : 80 Marks

Practical/Presentation : 20 Marks

Total :150 Marks

Duration of Exam. : 3 hrs.

The real challenge before the students starts when they cross the threshold of the college after completing their degree. They, all of a sudden, find themselves competing for job/P.G. Degrees, through various entrance test and interviews. Verbal ability forms a major portion of these tests. Without sound language skills and its semantic-syntactic know how, the students with engineering background find themselves almost under-prepared for such tests. With this difficulty of students in mind, this course is proposed to make them technically proficient in handling the language skills required in competitive exams. The course would expose students to almost all variety of items, the common run of such tests as CAT, GMAT etc. And in the context of LPG, this cutting edge competence becomes imperative, and no professional education can afford to overlook this aspect.

Course Content :**Unit I**

Remedial English : Parts to speech, Gerunds, Participles and infinitives; Clauses; Sentence-constructions (unity; avoidance of choppy and rambling sentences, logic and consistency, conciseness, sequencing of ideas); Sentence errors-agreement between verb and subject, pronoun and antecedents, sequence of tenses, problems involving modifiers (dangling and misplaced modifiers); Shifts in point of view-consistency of number and person, tense, mood, voice and subject, Parallelism; Omissions and mixed constructions.

Unit II

Vocabulary : Methods of building vocabulary- etymological roots, prefixes and suffixes; Commonly used foreign words and phrases; spelling : words often confused; synonyms and homonyms; one word substitutes; verbal idioms.

Unit III

Punctuation and Mechanics : End Punctuation; Internal Punctuation; Word Punctuation.

Unit IV

Comprehension : Abstracting : Summarising : Observations, Findings and Conclusion; Illustration and Inductive Logic; Deduction and Analogy.

Unit V

Presentation: Oral presentation-Extempore, discussion on topics of contemporary relevance, interviews.

Sanding :

1. Working with words by R. Gairns and S. Redman, Cambridge University Press, London.
2. Meanings into Words-Upper Intermediate Students Book, Deff/Jones, Foundation Books (Cambridge University Press, Delhi.
3. A Practical English Grammar by A.J. Thomson and A.V. Martinet, OUP, Delhi.
4. Examine your English by Margaret M. Maison, Orient Longman, New Delhi.
5. A Practical Guide to Colloquial Idiom by W.J. Ball, Longman.
6. A guide to Correct English by L.A. Hill, Oxford.
7. Structural Essentials of English by H. Whitehall, Longman.
8. Advanced English Practice by B.D. Graver, OUP, Delhi.
9. Public Speaking, Sudha Publication Pvt. Ltd., New Delhi.
10. Group Discussion, Sudha Publication Pvt. Ltd. New Delhi.

Scheme of Examination :**(A) Theoretical :**

The pattern of the exam would be more or less like the pattern of the competitive exams. (i.e, Objective Type) like CAT-G-MAT etc., as far as the units I, II, III and IV are concerned.

Unit-I, II, III : (30, 20, 10 Marks respectively)

The first section of the question paper will have 110 objective type questions with no choice at all. These 110 (60 + 40 + 10) questions will cover all the first three units (I, II, III) of the syllabus and would carry 30, 20, and 10 marks respectively. The questions may be in the form of multiple choices, fill-in-the-blank, supply the right word/choice, choose the right alternative, do as directed etc.

Unit-IV 20 Marks

The question from this unit will test comprehension competence (in the form of various elements mentioned in the unit) of text given.

(B) Practical (Presentation) :

There will be an oral test carrying 20 marks. The presentation part of section i.e. Unit-V will be covered in this test. Hence, there is no need to include this unit in theory exam.

There hours for a group of 15 students are required for this test. Test can be in the form of any of the activities mentioned in the Unit-V.

A panel of examiners appointed by the University will evaluate the presentation.

PHY-453-E**LASER TECHNOLOGY**

L T P

4 - -

Class Work : 50 Marks

Exam : 100 Marks

Total :150 Marks

Duration of Exam. : 3 hrs.

Conditions for Producing Laser, Concept of coherence-Special and temporal, Population Inversions, Einstein coefficient, Gain and Gain saturation, Saturation intensity, Development and Growth of a Laser Beam, Exponential growth factor, Threshold Requirement for a Laser.

Inversions and two-level systems, steady-state inversions and three and four-level systems. Transient Population Inversions, factors effecting population inversion Laser Amplifiers.

Excitation of Pumping Threshold Requirements, Pumping Pathways, Specific excitation Parameters Associated with Optical and Particle pumping.

Helium-Neon Laser, Co₂ Laser, Ruby Laser, Semiconductor diode Laser.

Recommended Books :

1. Laser Fundamentals by William T. Silfvast Cambridge University, Press.
2. Introductory University Optics by John Beynon, (PHI)
3. Laser-B.B. Laud.
4. Optics-A.K. Ghatak (TMH)

NOTE: Eight questions will be set and students will be required to attempt any five questions in all. All questions will carry equal marks.

CSE-303-E**COMPUTER GRAPHICS**

L T P

3 - -

Class Work : 50 Marks

Exam : 100 Marks

Total :150 Marks

Duration of Exam. : 3 hrs.

Unit-I

Introduction to Computer Graphics :What is Computer Graphics, Computer Graphics Applications, Computer graphics HArduare and Software, Two dimensional graphics primitives: Points and Lines, Line drawing algorithms : DDA, Bresenham's Circle drawing algorithms : Using Polar coordinates, Breenham's circle drawing, mid point circle drawing algorithm; Filled area algorithms : Scanline; Polygon filling algorithm, boundary filled algorithm.

Unit-II

Two/Three Dimensional Viewing : The 2-D viewing pipeline, windows, viewports, window to view port mapping; Clipping; point, clipping line (algorithms) : -4 bit code algorithm, sytherland -cohen algorithm, parametric line clipping algorithm (Cyrus Beck).

Polygon Clipping Algorithm : Sutherland -Hodgeman polygon clipping algorithm. Two dimensional transformations : transformations, translation, scaling, rotation, reflection, composite transformation.

Three dinesional transformations : Three dimensional graphics concept, Matrix representation of 3-D Transformations, Composition of 3-D transformation.

Unit-III

Viewing in 3D : Pojections, types of projections, the mathematics of planner geometric projections, coordinate systems.

Unit-IV

Hidden surface removal : Introduction to hidden surface removal. The Z buffer algorithm, scanline algorithm, area subdivision algorithm.

Unit-V

Representing Curves and Surfaces : Parametric representation of curves. Bezier curve, B. Spline curves. Parametric representation of surfaces; interpolation method.

Unit-VI

Illuminations, shading, image manipulation : Illumination models, shading modals for polygone, shadows, transparency. What is an image? Filtering, image missing, geometric transformation of images.

Unit-VII

Computer Graphics Principles an Practices second edition by James D. Foley, Andeies van Dam. Stevan K Feiner and Johb f. Hughes, 2000, Addision Wesley. computer Graphics by Donald Hearn and M,. Pauline Baker, 2nd Edition, 1999, PHI.

Reference Books :

1. Procedural Elements for Computer Graphics-David F. Rogers, 2001 T.M.H. Second Edition.
2. Fundamentals of 3 Dimensional Computer Graphics by Alan Watt, 1999, Addision Wesley.
3. Computer Graphics : Secrets and Solutions by corrign Joh, BPB.
4. Graphics, GUI, Games & Multimedia Projects in C by Pilania & Mahendra, Standard Publ.
5. Computer Graphics Secrets and Solutions by Corrigan Joh, 1994, BPV.
6. Introduction to Computer Graphics by N. Krishanmurthy T.M.H. 2002.

Note : Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

HUM-455-E**ENTREPRENEURSHIP**

L T P

3 1 -

Class Work : 50 Marks

Theory: 100 Marks

Total : 150 Marks

Duration of Exam. : 3 Hrs.

UNIT-I**Promotion of Entrepreneurship**

Meaning, definition and functions of an entrepreneur, qualities of a good entrepreneur, Role of Entrepreneur in economic development; Government measures for the promotion of small scale industries with special reference to Haryana; Cultural factors in developing entrepreneurship.

UNIT-II**Ownership and Location of Industrial Units**

Different forms of Industrial Organisation.

Theories of Industrial location. Process of preparing project reports.

UNIT-III**Size of Firm and Pricing**

Concept of optimum firm, factors determining

Optimum size. Technical, Managerial, Marketing Uncertainties and risk.

Pricing Methods, Policies and procedures.

UNIT-IV**Financing of Small Industries**

Importance and need : Commercial Banks and term lending in India; Banks and under writing of capital issues; Brief description about the role of other financial agencies viz, Industrial Finance Corporation of India. State Financial Corporation, Industrial Development Bank of India; Unit Trust of India.

UNIT-V**Problems Faced by Small Enterprises**

Problems connected with Marketing, Management of New Products, Power, finance; Raw Material; Under-utilization of capacity; Causes of under - utilization; Rehabilitation of Sick Mills.

UNIT-VI**Government and Business**

- (a) Highlights of Industrial Policy and Licensing Policy.
- (b) International Marketing with special reference to export documentation.

Recommended Books :

1. Entrepreneurship of Small Scale Industries - Deshpande manohar D. (Asian Publishers, New Delhi)
2. Environment and Entrepreneur - Tandon B.C. (Asian Publishers, New Delhi).
3. The Industrial Economy of India - Kuchhal S.C. (Chaitanya, Allahabad).
4. Emerging Trends in Entrepreneurship Development Theories & Practices - Singh P.Narendra (International Founder, New Delhi)
5. Entrepreneur, Banker & Small Scale Industries- Bhattacharya Hrisnikes.
6. Entrepreneurship & Growth of Enterprise in Industrial Estates - Rao Gangadhara.

NOTE: Eight questions are to be set atleast one question from each unit and the students will have to attempt five questions in all.z

L T P

4 - -

Class Work : 50 Marks**Theory : 100 Marks****Total : 150 Marks****Duration of Exam : 3 Hrs**

The course proposes to help students develop business and technical communication competence. It focuses on writing skills and strategies for specific purposes. The inevitability of introducing this course to Engineering students is embodied in that it has comparatively a high concentration of certain complex writing techniques and procedures.

COURSE CONTENT:**Unit-I**

Business correspondence: Characteristics and Formats of Business letter; Quotations, Orders, Tenders, Sales letters, claim and adjustment letters, Credit and Collection letters, Application Letters for vacant situations with emphasis on Resumes and Curriculum Vitae; E-mail and Netiquette - format, style and tone.

Unit-II

Business Reports and Proposals: Importance, Function, Pattern and formats of Reports, Typical Business Reports, Report Organisation and Presentation, and Formal Reports; Proposal Formats, Writing problem-Solving Proposals Executive Summary Proposals and project Proposals.

Unit-III

Meetings: Writing of Memorandum, Notes, Agenda and Minutes of Meeting.

Unit-IV

Public Relations and Advertising Documents: Press Releases, Public Service Announcements, Advertising Strategy and its objective, Designing of Classified and Display Advertising copies.

SUGGESTED READING:

1. Business Communication: Process & Product by Hary Ellen Guffey, IV Edition, South-Western College Publishing, Cincinnati.
2. Business Correspondence and Report Writing by R.C. Sharma & Krishna Mohan, Tata Macgraw Hill Publication, New Delhi.
3. Effective Business English and Correspondence by M.S. Ramesh and C.C. Pattanshetti, R. Chand & Co., New Delhi.
4. Effective Letters in Business by Robert by C. Shrueter, Tata Macgraw Hill, New Delhi.
5. English Business Letters by F.W. Wing & D. Anncrea, Orient Longman.
6. Written Communication in English by Sarah Freeman, Orient Longman.
7. International Business English by Leo Jones & Richard Alexander, Cambridge University Press.
8. General and Business English by Sweet Stephen, Sir Issac Pitman & Sons Ltd., London.
9. How to Write and Present Technical Information, Charles H. Sides, Cambridge University Press, U.K.
10. Strategies for Engineering communication, Susan Stevenson/ Steve Whitmore, John Wiley and Sons, Inc. Printed in India by Replika Press Pvt. Ltd., Delhi.

SCHEME OF EXAMINATION:

There will be six questions in all, covering all the units. All questions will be compulsory and will have enough internal choice.

Unit-I**30 Marks**

There will be two questions from this unit. One question will cover the theoretical aspect of business letter writing and will carry 10 marks. The other question will be on writing the letter

in a proper format on a subject given and will be of 20 marks. There will be enough choice taking care of the justice to be given to both the aspects of the letter writing.

Unit-II**35 Marks**

There will be two questions from this unit. One question will cover the theoretical aspect of report/proposal writing and will carry 15 marks. The other question will be on preparing the report/proposal on a topic/subject given and will be of 20 marks. There will be enough choice taking care of the justice to be given to both the aspects of the report writing.

Unit-III**15 Marks**

There will be a question on theoretical aspects of the various items of this unit or students can be asked to draft a specimen of any of these from the material given in the exam. The question can be split into parts.

Unit-IV**20 Marks**

There will be one question having two parts. One part will be on theory and will be of 5marks and the other will require the drafting an advertisement copy of a product or service or a public announcement and will carry 15 marks.

IC-403-E**EMBEDDED SYSTEMS DESIGN****L T P****3 1 -****Class Work : 50 Marks****Theory : 100 Marks****Total : 150 Marks****Duration of Exam : 3 Hrs.****UNIT 1 : INTRODUCTION:**

Different types of microcontrollers: Embedded microcontrollers, External memory microcontrollers; Processor Architectures: Harvard V/S Princeton , CISC V/S RISC; microcontrollers memory types; microcontrollers features : clocking, i/o pins, interrupts, timers, peripherals.

UNIT 2 : MICROCONTROLLER ARCHITECTURE:

Introduction to PIC microcontrollers, Architecture and pipelining, program memory considerations, Addressing modes, CPU registers, Instruction set, simple operations.

UNIT 3 : INTERRUPTS AND I/O PORTS:

Interrupt logic, Timer2 scalar initialization, IntService Interrupt service routine, loop time subroutine, External interrupts and timers, Synchronous serial port module, Serial peripheral device, O/p port Expansion, I/p port expansion, UART.

UNIT 4 : SOFTWARE:

Development tools/ environments, Assembly language programming style, Interpreters, High level languages, Intel hex format object files, Debugging.

UNIT 5 : PROGRAMMING WITH MICROCONTROLLERS:

Arithmetic operations, Bit addressing, Loop control, Stack operation, Subroutines, RAM direct addressing. state machines, Oscillators, Timer Interrupts, Memory mapped I/O.

UNIT 6 : DESINING USING MICROCONTROLLERS:

Music box, Mouse wheel turning, P W M motor control, Aircraft Demonstration, ultra sonic distance measuring, Temperature Sensor, Pressure Sensor, Magnetic Field Sensor.

TEXT BOOK:

1. Design with PIC Microcontrollers by John B. Peatman , Pearson.

REFERENCE BOOKS :

1. Programming and Customizing the 8051 Microcontroller : Predko ; TMH.
2. Designing Embedded Hardware : John Catsoulis ;SHROFF PUB. & DISTR. ND.
3. Programming Embedded Systems in C and C++ : Michael Barr; SHROFF PUB. & DISTR. ND.

AI AND EXPERT SYSTEMS**CSE-451 E**

L	T	P
3	1	-

Class Work : 50 Marks**Theory : 100 Marks****Total : 150 Marks****Duration of Exam : 3Hrs.****CONTENTS**

1. **Introduction to Artificial intelligence:** Scope, history & applications: AI as representation and search the predicate calculus inference rules. Logic based financial advisor, structures and strategies for state space search graph theory, strategies for space search, using state space to represent reasoning with the predicate calculus.
2. **Heuristic Search:** An algorithm for heuristic search, admissibility monotonicity and informed ness heuristics in games, complexity issues, control and implementation of state space search recursion based search, pattern directed search. Production systems, predicate calculus and planning the black board architecture for problems solving.
3. **LISP and PROLOG:** Knowledge representation languages issues in knowledge representation, network representation language, structured representations, introduction to LISP, Search in LISP: a functional approach to the farmer, Wolf, Goat and cabbage problem, higher order functions & procedural abstraction, search strategies in LIPS.
4. **Expert systems:** Introduction, History basic concepts, structure of expert systems, the human element in ES how ES works, problem areas addressed by ES, ES success factors, types of

expert systems, ES and the internet interacts web, knowledge engineering, scope of knowledge, difficulties, in knowledge acquisition methods of knowledge acquisition, machine learning, intelligent agents, selecting an appropriate knowledge acquisition method, knowledge acquisition form multiple experts validation and verification of the knowledge base, analyzing coding, documenting & diagramming.

5. **Expert systems-** II, societal impacts reasoning in artificial intelligence, inference with rules, with frames: model based reasoning, case based reasoning, explanation & meta knowledge inference with uncertainty representing uncertainty probabilities and related approaches, theory of certainty (certainty factors) Qualitative reasoning, the development life cycle, phases I, II, III, IV, V, VI the future of expert system development process societal impacts.

TEXT BOOKS

1. Efrain Turban and Jay E Aranson: Decision support systems & intelligent systems (5th Edn.) Prentice hall, 1998.
2. Donald A Waterman: A Guide to expert Systems, Addison - Wesley 1995
3. G.F. Luger & W.A Stubble Field -Artificial Intelligence structures and Strategies for complex problem solving, 3 rd Edn. Addison Wesley 1998.
4. E.Rich and Knight, Artificial Intelligence, Second Edn, Tata Mc. Graw Hill Publishing, 1981.

IT-471 E MANAGEMENT INFORMATION SYSTEM

L	T	P
4	-	-

Class Work : 50

Exam : 100

Total : 150

Duration of Exam: 3 Hrs.

Unit-1: Foundation of Information System:

Introduction to Information System and MIS, Decision support and decision making systems, systems approach, the systems view of business, MIS organization within company, Management information and the systems approach.

Unit-2: Information Technology :

A manager's overview, managerial overviews, computer hardware & software, , DBMS, RDBMS and Telecommunication.

Unit-3: Conceptual system design :

Define the problems, set systems objects, establish system constraints, determine information needs determine information sources, develop alternative conceptual design and select one document the system concept, prepare the conceptual design report.

Unit-4 : Detailed system design :

Inform and involve the organization, aim of detailed design, project management of MIS detailed design , identify dominant and trade of criteria, define the sub systems, sketch the detailed operating sub systems and information flow, determine the degree of automation of each operation, inform and involve the organization again, inputs outputs and processing, early system testing, software, hardware and tools propose an organization to operate the system, document the detailed design revisit the manager user.

Unit-5 : Implementation evaluation and maintenance of the MIS:

Plan the implementation, acquire floor space and plan space layouts, organize for implementation, develop procedures for implementation, train the operating personnel, computer related acquisitions, develop forms for data collection and information dissemination, develop the files test the system, cut-over, document the system, evaluate the MIS control and maintain the system. Pitfalls in MIS development .

Unit-6: Advanced Concepts in Information Systems

Enterprise Resources Management(ERP), Supply Chain Management, C R M , Procurement Management System.

Text Books:

- Management Information System by W. S. Jawadekar, 2002, Tata McGraw Hill.
- Information System for Modern Management (3rd edition)- Robert G. Murdick, Loel E. Ross & James R. Claggett. PHI

Reference books:

- Management Information System; O Brian; TMH
- Management Information System by Davis Olson Mac Graw Hill
- Management Information System by Staslings,(Maxwell Mc Millman Publishers)
- Information System; a Management Perspective; Alter Addison Wesley
- Introduction to Information System; McGraw Hill

Note: Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

PHY-151-E**NANO TECHNOLOGY**

L	T	P
3	2	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 hours

UNIT 1 INTRODUCTION TO NANOTECH

Crystalline-Non crystalline materials, Fundamental of Nanotechnology and Nanomaterials in Metals, other Materials, & Biosystem, Molecular Recognition, Quantum Mechanics and Quantum Ideas in Nanotechnology. Semiconductor Nanoparticles.

UNIT 2 PREPARATION AND CHARACTERIZATION OF NANOPARTICLES

Nanoscale Lithography, Dip Pen Lithography, E-Beam Lithography, Nanosphere Life off, Lithography; Molecular Synthesis, Nanoscale Crystal Growth, Polymerization Nanobricks and Building blocks:

Tools for Measuring Nanostructures - Scanning Probe Instrument, Spectroscopy, Electrochemistry, Election Microscope Tools to Make Nanostructure.

UNIT 3 PROPERTIES & APPLICATION OF NANO CRYSTALLINE MATERIALS

Application in Sensors, Nanoscale Biostructure Electronics, Magnets, Optics, Fabrication Biomedical Applications, Smart Materials - Self Healing Structures, Heterogenous Nanostructure and composites En Capsulation, Carbon Nanotubes.

UNIT 4

Synthesis of semiconductor Nanoclusters, Processing of Nanomaterials

Nanobusiness - Boom, Bust and Nano Tech. NanoEthics

REFERENCES:

1. Camarata, R.C. Nanomaterials synthesis, properties and application Institute of Physics Publication
2. Madou, Fundamentals of microfabrication, Mcgraw Hill.
3. Sibelia, J.P., A Guide to material characterization, Prentice Hall.
4. Mark Ratner, Daniel Ratner - NanoTechnology - A Gentle Introduction to the Next Big Idea.

Note : The question paper will contain 8 questions in all. The student will be required to answer any five. At the most one question will be set from each section.

IT-204 E**Multimedia Technologies**

L	T	P
3	1	-

Class Work : 50

Exam : 100

Total : 150

Duration of Exam : 3 Hrs.

Unit-1: Basics of Multimedia Technology :

Computers, communication and entertainment; multimedia an introduction; framework for multimedia systems; multimedia devices; CD- Audio, CD-ROM, CD-I, presentation devices and the user interface; multimedia presentation and authoring; professional development tools; LANs and multimedia; internet, World Wide Web & multimedia distribution network-ATM & ADSL; multimedia servers & databases; vector graphics; 3D graphics programs; animation techniques; shading; anti aliasing; morphing; video on demand.

Unit-2 : Image Compression & Standards :

Making still images; editing and capturing images; scanning images; computer color models; color palettes; vector drawing; 3D drawing and rendering; JPEG-objectives and architecture; JPEG-DCT encoding and quantization, JPEG statistical coding, JPEG predictive lossless coding; JPEG-DCT encoding & quantization, JPEG statistical coding, JPEG predictive lossless coding; JPEG performance; overview of other image file formats as GIF, TIFF, BMP, PNG etc.

Unit-3: Audio & Video :

Digital representation of sound; time domain sampled representation; method of encoding the analog signals; subband coding; fourier method; transmission of digital sound; digital audio signal processing; stereophonic & quadraphonic signal processing; edition sampled sound; MPEG Audio; audio compression & decompression; brief survey of speech recognition and generation;

audio synthesis; musical instrument digital interface; digital video and image compression; MPEG motion video compression standard; DVI technology; time base media representation and delivery.

Unit-4 : Virtual Reality:

Applications of multimedia, intelligent multimedia system, desktop virtual reality, VR operating system, virtual environment displays and orientation making; visually coupled system requirements; intelligent VR software systems.

Applications of environment in various fields.

Text Books:

- An introduction, Villamil & Molina, Multimedia Mc Milan, 1997
- multimedia: Sound & Video, Lozano, 1997, PHI, (Que)

Reference Books:

- Multimedia: Production, planning and delivery, Villamil & Molina, Que, 1997
- Multimedia on the PC, Sinclair, BPB
- Multimedia: Making it work, Tay Vaughan, fifth edition, 1994, TMH.
- Multimedia in Action by James E Shuman, 1997, Wadsworth Publ.,
- Multimedia in Practice by Jeff coate Judith, 1995, PHI.
- Multimedia Systems by Koegel, AWL
- Multimedia Making it Work by Vaughar, etl.
- Multimedia Systems by John .F. Koegel, 2001, Buford.
- Multimedia Communications by Halsall & Fred, 2001, AW.

Note : Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

IC-455-E INTELLIGENT INSTRUMENTATION FOR ENGINEERS

L T P

3 - -

Sessionals : 50 Marks

Exam. : 100 Marks

Total : 150 Marks

Duration of exam. : 3 hrs.

- 1. INTRODUCTION :** Intelligence, features characterizing intelligence, intelligent instrumentation system; features of intelligent instrumentation; components of intelligent instrumentation system; Block diagram of an intelligent instrumentation system.
- 2. SIGNAL PROCESSING, MANIPULATION AND TRANSMISSION:** Signal amplification & attenuation (OP-AMP based); Instrumentation Amplifier (circuit diagram, high CMRR & other features); Signal Linearization (different types such as Diode-resistor combination, OP-AMP based, etc.); Bias Removal, Signal filtering (outputs from ideal filters, outputs from constant-k filters, matching of filter sections, active analog filters); OP-AMP based Voltage-to-current converter, Current-to-voltage conversion, Signal integration, Voltage follower (pre-amplifier), voltage comparator, Phase-locked loop, Signal addition, Signal multiplication, Signal Transmission (Signal amplification, Shielding, Current loop transmission, Voltage-to-frequency conversion, Fiber optic transmission); Description of Spike Filter (software-based).
- 3. SMART SENSORS:** Primary sensors; Excitation; Compensation (Nonlinearty: look up table method, polygon interpolation, polynomial interpolation, cubic spline interpolation, Approximation & regression; Noise & interference; Response time; Drift; Cross-sensitivity); Information Coding/ Processing; Data Communication; Standards for smart sensor interface.

4. INTERFACING INSTRUMENTS & COMPUTERS : Basic issues of interfacing; Address decoding; Data transfer control; A/D converter; D/A converter; Sample & hold circuit; Other interface considerations.

5. RECENT TRENDS IN SENSOR TECHNOLOGIES :

Introduction; Film sensors (Thick film sensors, Thin film sensors); Semiconductor IC technology - standard methods; Microelectro-mechanical systems (Micro-machining, some application examples); Nano-sensors.

TEXT BOOK:

1. Barney, G.C., Intelligent Instruments. Hemel Hempstead: Prentice Hall, 1985.
2. Alan S. Morris, Principles of Measurement & Instrumentation. N. Delhi: PHI Pvt. Ltd., 1999.

REFERENCE BOOK:

1. D. Patranabis, Sensors & Transducers N. Delhi: PHI, 2003.
2. Roman Kuc, Introduction to Digital Signal Processing. N. York: McGraw-Hill Pub. Co.

- NOTES:**
1. In the semester exam., the examiner will set 8 questions in all covering the entire syllabus. Students will be required to attempt any five questions.
 2. Use of scientific calculator will be allowed in the Exam. However, pager, programmable calculator & cellular phone etc. will not be allowed.

HUM-453-E

L T P

4 - -

HUMAN RESOURCES MANAGEMENT

Class Work : 50 Marks

Theory : 100 Marks

Total : 150 Marks

Duration of Exam.: 3 Hrs.

Unit-I : Understanding Organisational Behaviour

Definition, Goals of Organisational behaviour. Key forces affecting Organisational Behaviour. Fundamental Concepts of Organisational Behaviour.

Unit-II : Motivation

Meaning, Objectives and importance of motivation. Theories of Motivation, Maslow's theory, Mc Greger's Theory Herzberg's theory.

Morale : Meaning; Factors affecting morale, types of morale morale and productivity, Evaluation of morale, improving morale.

Unit-III : Communication

Definition & importance of Communication; Formal & informal communication, Barriers in communication.

Unit-IV : Leadership

Definition & importance, Nature of leadership various approaches to leadership styles.

Unit-V

Importance of human resources in industry, Definition of human resource management, mechanical approach towards personnel, Paternalism, Social system approach.

Unit-VI

Need for human resource planning, process of human resource planning, Methods of recruitment, Psychological tests and interviewing, Meaning and importance of placement, Meaning and techniques of induction. Training and development : Concepts of training and development, Importance of training and development, Management development its nature, purpose and method.

Unit-VII

Significant factors affecting compensation, Methods of wage payment, Wage differentials, Causes of difference in Wages, Types of wage differentials, Wage incentives, Meaning, Objectives, types of incentive plans.

Recommended Books :**Text Books :**

1. Human Resource and Personnel Management - K. Aswathappa - Tata McGraw Hill Publishing Company Ltd.
2. Personnel Management : C.B. Mamoria, Himalaya Publishing House.
3. Organisational Behaviour - Dr. L.M. Prasad (Sultan Chand & Sons).

Reference Books :

1. Personnel Management & Industrial Relations : Dr. T.N. Bhagoliwal : Sahitya Bhawan Agra.
2. Personnel Management : V.G. Karnik, Jaico Publishing House.
3. Personnel management & Industrial Relation: Tripathi: Sultan Chand & Sons.
4. Personnel Management - Arun Monappa & Mirza Saiyadain - Tata McGraw Hill Publishing Co. Ltd.
5. Personnel Management and Industrial Relations - D.C. Sharma & R.C. Sharma S.J. Publications.
6. Principles of Personnel Management - Edwin B. Flippo (McGraw Hill).
7. Organisational Behaviour - K. Adwathappa.
8. Organizational Behaviour - John W. Newsstorn & Keith Davis, Tata McGraw - Hill Publishing Company Limited, New Delhi.

Note: Eight questions are to be set at least one question from each unit and the students will have to attempt five questions in all.

CH-453-E**POLLUTION AND CONTROL**

L T P

4 - -

Class Work : 50 Marks**Theory : 100 Marks****Total : 150 Marks****Duration of Exam.: 3 Hrs.****1. Waster Water & its treatment Processes:-**

Waster-water characteristics, effluent standards, primary treatment, secondary treatment - aerobic (activated sludge, aerated lagoons, trickling filter, roughing filter, rotating biological contactor) anaerobic (contact process, UASB).

II Air Pollution:

Classification of air pollutants

Particulates: Physical characteristics, mode of formation, setting properties, Control measures.

Hydrocarbons: Nature; sources, control

Carbon Monoxide: Source, harmful effects on human health, control measures.

Axides of Sulphur and Nitrogen Sources, effects on human health and plants. Control measure.

III. Solid Waste: Types, sources and properties of solid waste, aolid waste management - Generation, Collection and techniques for ultimate disposal, Elementary discussion on resource and energy recovery.

IV. Elementary treatment of nuclear pollution, metal pollution, noise pollution their effects & control.

Books Suggested:

1. Environmental Engg.: by Howard s. Peavy & Others, MGH International.

2. Metacaf - EDDY - Waste-water engineering revised by George Teholonobus (TMH)
3. Environmental Chemistry by B.K. Sharma, Goel Publishing, Meerut.
4. Environmental Chemistry, A.K.DE, Wiley Eastern.
5. Air Pollution: H.C. Perking - Mc Graw Hill.

Note: Eight questions will be set and students will be required to attempt five questions in all.

ME-451-E**MECHATRONIC SYSTEMS****L T P****4 - -****Class Work : 50 Marks****Theory : 100 Marks****Total : 150 Marks****Duration of Exam.: 3 Hrs.****UNIT 1**

Introduction to Mechatronics. Integrated design issues in Mechatronics, Conceptual design. Possible design solutions. Integrated approach for combining sensors, actuators, computer and the product. Some examples - like auto focus camers, engine combustion control, washing machine, vehicle suspensions, electro-mechanical brakes, manufacturing machine, industrial robots, air conditioning systems, etc.

UNIT 2

Classification of sensors of various type, resistive, strain gage, themistor, inductive, capacitive, piezoelectric, optical, photodetectors, encoders, ultrasonic types Silicon sensors, Micro-sensors for various measurements. Consideration for choice of sensors for a given application.

Signal conditioning and data acquisition using computers. AD and DA converters. Use of plus-in-cards and software for acquiring data from several sensors.

UNIT 3

Mechanical actuation systems - kinematic chains, cams, gear trains, beld and chains drive, ratchet and pawl, bearing, guideways, ball screw and nut, etc. Electrical actuation systems: Operational characteristic and application of electrical actuation

components for application like, AC/DC motors, stepper motors, relays, push buttons, switches, solenoids etc.

UNIT 4

Introduction to semiconductor electronics, junction diode, bipolar junction transistor, field effect transistors, digital logic. Number systems. Logic gates Boolean algebra. Application of logic gates. Combinational and sequential logic.

UNIT 5

Sequence control, relay ladder diagrams for sequence control in processes and machines. Programmable Logic Controllers and applications: PLC structures, PLC languages, programming of PLC using Mnemonics, Interfacing PLC with actuators, Sequencing of cylinders. Timers, internal relays and counters. Open loop and closed loop control using PLC.

UNIT 6

Architecture of microprocessors and microcontrollers. Use of suitable software languages for micro controllers and their applications in mechatronic systems. Real time interfacing between computers and measurement or control systems. Introduction to modeling and computer control of process and mechanical systems.

UNIT 7

Communication systems Protocols, Open systems interconnection models. Smart transducers and transmitters. Field buses.

TEXT BOOKS:

1. Mechatronics - Electronic control in mechanical & electrical engineering by W.Bolton, Longman Indian Edn. 1999.

2. Mechatronic system design, by D.Shetty and R.A. Kolk - Mechatronic system design, PWS Publ. Co., Boston, 1997.
3. Mechatronics and Measurement Systems by D.G.Alciaiore and M.B. Histan, TMH Publ. 2nd Edn. 2003.

NOTE: In the semester examination, the examiner will set 8 questions in all, and students will be required to attempt only 5 questions.